REMARKS/ARGUMENTS

Claims 1 to 30 are currently pending in this application. No amendments have been made with this response.

Rejections Under 35 USC 103(a) Over Zhang et al. and Peker et al.

The Examiner rejected claims 1 to 7, 9 to 14 and 16 to 20 under 35 U.S.C. §103(a) over Zhang et al. (U.S. Patent No. 6,767,418) in view of Peker et al. (U.S. Patent Publication No. 2006/0108033). Applicants respectfully traverse this rejection.

The current invention is directed to the use of bulk-solidifying amorphous alloys in the manufacture of medical stents. More specifically, to a medical stent where the stent is placed under an elastic strain of at least 1.0% in the compacted form. By using such materials it is possible to form smaller stents that provide much greater expansive force that is available with conventional materials. (Specification, ¶¶ 6 to 7.) In contrast, the Zhang et al. reference cited by the Examiner is directed to a wide-variety of medical devices formed form conventional crystalline Zr-Ti-based alloys.

The Examiner alleges that Zhang et al. teach the use of amorphous alloys in the construction of medical devices, and specifically the manufacture of medical stents. However, Applicants would submit that a careful review of the Zhang et al. reference calls into question this initial assumption. First, in the section of the Zhang et al. reference quoted by the Examiner as discussing the use of "amorphous" materials, the authors are in fact pointing out the deficiencies in these materials, stating:

> Recent studies and JP-A-07-188,876 disclose a Zr30Ti20Al25Pd25 alloy (atomic percent) as a Zr-based metallic glass; and JP-A-10-211,184 discloses a Zr60Al15Ni15Cu5Co5 alloy (atomic percent). These alloys are Zr-based amorphous alloys utilizing its corrosion resistance and non-magnetism. The manufacture of these amorphous alloys has been subjected to the restriction that such special methods of production as a

liquid quenching method and a powder molding method should be adopted.

(Zhang et al., col. 3, lines 55 to 63.)

Beyond this Zhang et al., further discounts the use of all of the materials discussed in the "Background" section of their disclosure in the very next paragraph stating,

> The titanium alloys and the zirconia alloys, as described above, respectively contain Ti and Zr as a main component in an amount of not less than 50% by weight. These alloys, on account of outstanding corrosion resistance, have been considered as an important biocompatible material and have been researched for further development. It, however, has been an universally known fact that they are deficient in workability and in cutting efficiency as compared with ordinary stainless steel. Further, since they have been designed as materials for an artificial joint and an artificial heart, they have not been awarded due consideration of contrast and opaqueness to X-ray. As regards the demands imposed in recent years on medical appliances, the popularization of a magnetic resonance imaging (MRI) apparatus has reached the point of urging the necessity of avoiding exertion of an influence on the image of MRI.
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> (Zhang et al., col. 3, line 65 to col. 4, line 12.)

Moreover, Zhang et al. discuss the "manufacture" of the alloys repeatedly throughout the '418 patent, in each case the authors state the following:

> The method for producing the Ti--Zr type alloy of this invention does not need to be particularly discriminated but is required only to be capable of producing an alloy having such a specific composition as mentioned above. As typical examples of this method of production, a method which

> comprises steps of weighing required elements . . . in a prescribed composition (% by weight), arc melting the elements in a water-cooled copper hearth, transforming the resultant molten mass into an alloy, and forming the alloy in an ingot; a method which comprises steps of melting the elements in a crucible, transforming the molten mass into an alloy, and atomizing the alloy into a powder; a method which comprises steps of similarly melting the elements and casting the resultant molten mass; a method which comprises steps of levitation melting the elements, transforming the molten mass into an alloy, and forming the alloy in an ingot; such methods as a mechanical alloying method, a sputtering method, and a plasma method which have been generally carried out on a commercial scale; and methods published by various research institutes and reported in literature may be cited.
>
> (Zhang et al., col. 10, lines 33 to 59.)

Finally, Zhang et al. repeatedly specify that the alloys formed in accordance with their invention take the form of a β-phase crystalline structure. For example, they state in relevant part:

> The Ti--Zr type quaternary alloy of this invention which has a composition in the specified range mentioned above exhibits exceptionally fine workability such that the work of rolling, forging, or mechanical processing can be carried out at normal temperature in spite of the fact that it is an alloy having Ti and Zr as main components thereof because the metallic texture thereof assumes the β-phase at normal temperature. As one example of the metallic texture, an X-ray diffraction diagram illustrating the β-phase of the Ti--Zr type quaternary alloy (Ti-34.8Zr-11.8Nb-23.0Ta) manufactured in Example 2 to be cited herein below is illustrated in FIG. 1.

(Zhang et al., col 10, line 60 to col. 11, line 4.)

In summary, Applicants would submit that not only does the Zhang et al. reference only teach methods and materials for making medical devices such as stents from conventional crystalline alloys, but the patent actually teaches away from using amorphous materials by contrasting the difficulty in manufacturing amorphous materials and the poor properties of the materials as compared to the Zr-Ti-Nb-Ta alloys described in the Zhang et al. patent itself.

Nor does the cited Peker et al. reference provide teachings to correct the deficiencies in the underlying Zhang et al. reference. Specifically, as the Examiner points out the Peker et al. reference is directed to the use of amorphous materials in dental implants, not medical stents. Nowhere does the Peker et al. reference ever teach, discuss or even suggest the use of such materials for stents. Moreover, Applicants submit that the cited Peker et al. reference is not properly cited as prior art under 35 U.S.C. §103(a) as the only possible provision of the law under which the Peker et al. reference could be considered prior art is §102(e), and the named inventors for both the Peker et al. reference and the current application were under an obligation, at the time of the invention, to assign their rights in the inventions to the same entity, namely, LiquidMetal Technologies, Inc., the entity listed as Applicant on both of the PCT applications upon which the US cases claim priority. Under the rules set forth in the MPEP §706.02(b), where the two inventions are made by the same applicant the references are not citable as prior art under 35 U.S.C. §102(e). Assignments for both of these applications were recently completed and submitted to the U.S. Patent Office for recordation. Copies of these assignments are attached with this response.

Accordingly, Applicants submit that one of ordinary skill in the art, having read the sole prior art reference, Zhang et al., would have had no teaching whatsoever upon which to conclude that bulk solidifying amorphous alloys could be used to successfully

form medical stents, and moreover it is Applicants position that the Zhang et al reference would have actively discouraged the use of such materials.

Rejections Under 35 USC 103(a) Over Zhang et al. and Peker et al.

The Examiner rejected claims 8 and 21 to 30 under 35 U.S.C. §103(a) over Zhang et al. (U.S. Patent No. 6,767,418) in view of Opie et al. (U.S. Patent Publication No. 2006/0149391). Applicants respectfully traverse this rejection for the reasons given above.

Specifically, as explained above the Zhang et al. reference nowhere provide and teaching, discussion or even suggestion for the use of amorphous materials. Moreover, as quoted above one of the principal advantages cited by Zhang et al. as to the advantage of using the Zhang et al. material is the fact that it can be manufactured using any standard process, and is not limited to the highly restrictive quenching techniques required for use by amorphous alloy materials. (See, e.g., (Zhang et al., col. 3, lines 55 to 63 & col. 10, lines 33 to 59.)

In addition, Applicants again would point out that the Opie et al. reference is not properly prior art to the current application. Specifically, again the only possible provision of the law under which the Peker et al. reference could be considered prior art is §102(e), and the named inventors for both the Opie et al. reference and the current application were under an obligation, at the time of the invention, to assign their rights in the inventions to the same entity, namely, LiquidMetal Technologies, Inc., the entity listed as Applicant on both of the PCT applications upon which the US cases claim priority. Under the rules set forth in the MPEP §70602(b), where the two inventions are made by the same applicant the references are not citable as prior art under 35 U.S.C. §102(e). Assignments for both of these applications were recently completed and submitted to the U.S. Patent Office for recordation. Copies of these assignments are attached with this response.

Accordingly, Applicants again submit that one of ordinary skill in the art, having read the sole prior art reference, Zhang et al., would have had no teaching whatsoever upon which to conclude that bulk solidifying amorphous alloys could be used to successfully form medical stents in accordance with the methods set forth in claims 21 to 30, and moreover it is Applicants position that the Zhang et al reference would have actively discouraged the use of such techniques.

Conclusion

In view of the foregoing response, it is believed that the application is in condition for allowance. If any questions remain regarding the allowability of the application, Applicant would appreciate if the Examiner would advise the undersigned by telephone.

Respectfully submitted,

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